LAPG 2570.5

Effective Date: June 28, 2004
Expiration Date: June 28, 2009

Langley Research Center

RADIO FREQUENCY SPECTRUM MANAGEMENT

National Aeronautics and Space Administration

Responsible Office: Systems Engineering Competency

PREFACE

P.1 PURPOSE

The Radio Frequency (RF) spectrum management ~~practices~~ procedural requirements contained in this ~~procedural guideline~~ directive are based on established Federal regulations, Agency Policy and Procedures, and Government-industry standards, supplemented where necessary by a minimum of requirements peculiar to the NASA Langley Research Center. This LAPG is pursuant to NPD 2570.5, "NASA Radio Frequency Spectrum Management," and NPR 2570.1, "NASA Radio Frequency (RF) Spectrum Management Guidelines."

The purpose of this ~~procedural guideline~~ directive is to set forth ~~practices~~ procedural requirements and responsibilities for the management and utilization of RF spectrum, particularly the purchase and use of RF frequency transmitting devices, at the Langley Research Center. This procedural ~~guideline~~ requirement document will be maintained by the Langley RF Spectrum Manager.

P.2 APPLICABILITY

This LAPG is applicable to Langley Research Center employees.

P.3 AUTHORITY

a. NASA Policy Directive (NPD) 2570.5, "NASA Radio Frequency Spectrum Management."

P.4 REFERENCES

a. NASA Procedural Requirements (NPR) 2570.1, "NASA Radio Frequency (RF) Spectrum Management Manual."

P.5 CANCELLATION

LAPG 2570.5, dated August 1999.

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Chapter 1

1.0 DESIGNATIONS

In accordance with NPD 2570.5, "NASA Radio Frequency Spectrum Management," the Center Director designates the LaRC Spectrum Manager and Alternate. Both the Spectrum Manager and Alternate are located in the Systems Engineering Competency. The Spectrum Manager and alternate ~~can be found~~is identified in the LaRC Telephone Directory.

Chapter 2

2.0 RESPONSIBILITIES

2.1. LaRC Spectrum Manager

2.1.1 Coordinate all the Radio Frequency (RF) spectrum requirements pertaining to activities and projects involving Langley Research Center (LaRC) with the Agency Spectrum Program Manager in compliance with NPD 2570.5 and NPR 2570.1.

~~3.1.2 Maintain accurate records of all frequency assignments in use by LaRC activities and projects, whether on-site or off-site.~~

~~3.1.3 Maintain the electromagnetic integrity of the site by means of proper selection of RF equipment location and electromagnetic compatibility (EMC) testing, prior to issuance of radio frequency assignments.~~

~~3.1.4 Ensure the day-to-day interference-free operations at the site, and radio frequency interference (RFI) incident reporting.~~

~~3.1.5 Identify communications and other RF spectrum requirements such as active and passive remote sensing requirements, of future missions proposed by LaRC, and reported early as possible to the Agency Spectrum Program Manager at GRC for inclusion in NASA long-range spectrum forecasts.~~

~~3.1.6 Participate in local, national and international spectrum management coordination groups, as appropriate, and to provide representation and cognizance of LaRC's projects requirements.~~

~~3.1.7 Coordinate the development and maintenance of LaRC instructions for spectrum management with the National Spectrum Program Manager to ensure Agency-wide program consistency.~~

2.1.2 Assign experimental call signs for NASA radio nets, when applicable.

~~3.1.9 Prepare technical analyses required supporting spectrum management submittals for LaRC projects.~~

~~3.1.10 Serve as the representative for the Agency Spectrum Program Manager to the NASA programs/projects at LaRC.~~

~~3.1.11 Ensure that RF and electromagnetic field emissions conform to the latest requirements of ANSI/IEEE c95.1, Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields 3 kHz to 300 GHz and the ICNIRP Electromagnetic Field Standard, 1 Hz to 300 GHz.~~

~~3.1.12 The Spectrum Manager has the responsibility to ensure coordination of RF~~

~~spectrum requirements with the NASA Center Safety and Mission Assurance Office. All RF spectrum requirements will be coordinated with the Center Occupational Health Office. Based on the particular Center mission responsibilities, RF emissions shall be coordinated with other operations such as range safety, flight operations, operation safety, explosive safety, and propellant handlers.~~

2.2 LaRC Alternate Spectrum Manager

Assist and ~~provide~~ serves as backup for the LaRC Spectrum Manager.

2.3 Individuals Assigned NASA Radio Frequencies

Adhere to the procedures set forth in this~~e~~ LAPG ~~for Radio Frequency Spectrum Management~~.

2.4 Office of Procurement

Ensure that the LaRC Spectrum Manager or Alternate has approved all purchase requests for equipment intended to emit radio frequency signals prior to procurement of the equipment.

2.5 Contracting Officers

Ensure that the affected contractors are apprised of, and comply with, the provisions of this LAPG, as required by their respective contracts.

2.6 Program Managers

Apprise the LaRC Spectrum Manager of the proposal and development of new projects that will require the use of the radio frequency spectrum.

2.7 ~~Heads of Primary Organizations~~Branch Heads and Project Managers

2.7.1 Submitting all frequency authorization requests for use on LaRC and vicinity to the LaRC Spectrum Manager. (See LF 400, “Langley Research Center Spectrum Management Radio Frequency Authorization Request,” and Chapter 4 of this document.)

2.7.2 Complying with ~~paragraph 7 of NHB~~ NPR 2570.1~~6A~~, chapter 1, paragraph 1.2, when initiating action for either the development or procurement of communications-electronic systems requiring the use of the radio frequency spectrum.

2.7.3 Apprising the Spectrum Manager of previously authorized FCC or Inter department Radio Advisory Committee (IRAC) radio frequencies prior to usage at LaRC and vicinity; and withholding usage until approved by the LaRC Spectrum Manager and until local authority has been issued.

2.7.4 Promptly reporting Radio Frequency Interference (RFI) to the Spectrum Manager.

2.7.5 ~~Assisting LaRC management when interference is reported~~Provide any required resource to lower level management and the Spectrum Manager to remove any frequency interference.

2.7.6 Assuring compliance with this procedural ~~guideline~~ requirement in requesting and utilizing frequency assignments.

2.7.7 Enforcing transmission restrictions as posted.

Chapter 3

3.0 DEFINITIONS

3.1 FREQUENCY ALLOCATION - The process whereby a portion of the radio frequency spectrum is set aside for a particular use or service.

3.2 FREQUENCY ASSIGNMENT - The authorization for the use of a particular frequency for either Government or non-Government operations.

3.3 RADIO FREQUENCY AUTHORIZATION (RFA) - The authorization for the use of specific radio equipment on assigned frequencies.

3.4 SPECTRUM MANAGEMENT - For the purpose of this procedural ~~guideline~~requirement, this term includes, but is not limited to, the following:

3.4.1 Coordinating and consulting with appropriate technical personnel regarding procurement description of electronic radiating devices within portions of the radio frequency spectrum as they affect LaRC.

3.4.2 Coordination of frequency usage.

3.4.3 Allocation of frequencies.

3.4.4 Assignment of frequencies

3.4.5 Efficient use of the radio frequency spectrum.

3.4.6 Reducing radio frequency interference (RFI).

Chapter 4

4.0 ADMINISTRATIVE PROVISIONS FOR RADIO FREQUENCY SPECTRUM MANAGEMENT

4.1 Radio Frequency Authorization

4.1.1 A Radio Frequency Authorization (RFA) must be issued by the Spectrum Manager prior to the operation of any communications or electronic equipment that intentionally radiates or re-radiates radio frequency signals.

4.2 Radio Frequency Authorizations Requests (RFA)

4.2.1 RFAs are obtained by completing a Radio Frequency Authorization Request form (LF 400) and submitting it to the Spectrum Manager. Minimum processing time is at least 90 days for requests for use periods of one year or less and 180 days for requests for a use periods of more than one year. It is not unusual to take much longer. Users are advised to submit their requests as soon as possible. Forms are available at the Spectrum Manager's Office (864-5407).

4.3 Procurement authorizations

4.3.1 It is Federal policy (OMB Circular No. A-11) that, pending assurance of the availability of the appropriate RF spectrum support, no funds will be obligated for the research, development or acquisition of components; for modification of major communications and electronics equipment or systems; or for the selection, procurement and deployment of space or terrestrial radio stations and facilities when such items require RF spectrum support. Approved RF requirements must be made a part of the specifications included with the procurement request or requisition. This policy was adopted to ensure the purchase of appropriate equipment that is designed to operate in Federal radio bands.

4.4 Use of FCC licensed devices

4.4.1 In the United States, the National Telecommunications and Information Administration (NTIA) manages the Federal Government's use of the radio frequency spectrum while the Federal Communications Commission (FCC) manages all other uses. To allow the two agencies to effectively manage the spectrum for their respective users, there are specific allocations for Federal use and non-Federal use. All radio stations that are operated by or for the Federal Government receive "frequency assignments" from the NTIA and must operate in the portions of the spectrum that are allocated for Federal Government use. All other users receive operating licenses issued by the FCC for frequencies in the non-Government spectrum allocations. Non-Government users (contractors, private individuals, etc.) may use FCC licensed devices at LaRC subject to the following restrictions:

4.4.1.a Because they are employees of the Federal Government, civil service personnel may not normally utilize RF devices that operate in the non-Government spectrum in the performance of their official duties. Exceptions can be made when it is necessary for Government and non-government users to communicate on the same frequency such as Police, Fire and other Emergency situations.

4.4.1.b Equipment that is purchased with Government funds, either outright or GFE, considered to be a Government Radio Station and may not be operated on frequencies within non-Government (i.e.-FCC) spectrum allocations.

4.4.1.c When the use of FCC licensed devices is permitted, the user must posses a valid FCC license and must receive a RFA from the Spectrum Manager prior to using the devices.

4.4.1.d The devices must not cause interference to NASA's official-use official-use communications systems. If interference occurs, use of the devices must be terminated until the cause of the interference is resolved.

4.4.1.e Resolution of RFI caused to an FCC licensed device is the responsibility of the user.

4.4.2 Contractors should request RFAs through the cognizant Contracting Officer. A copy of the user's FCC license must accompany the request. The devices must be retained by the Contractor when the contract is terminated.

4.4.3 The use of hand-held and mobile voice communications equipment by private individuals who hold a valid FCC license in the Amateur Radio Service, Citizen's Radio Service (CB), or General Mobile Radio Service (GMRS) does not require an RFA; however, users who are found to be violating FCC Rules and Regulations will lose their privilege to operate on LaRC. The use of all non-voice communications equipment (radio control, data transmission, etc.) does require an RFA.

4.4.4 The limited use of FCC-licensed devices by the broadcast media does not require a RFA as the broadcast media is regulated by the FCC. However, a copy of the FCC license for all frequencies that will used at LaRC may be required by the LaRC Spectrum Manager.

4.4.5 RFAs are not required for the use of cellular telephones.

4.4.6 No radio transmissions will be permitted in areas so posted.

4.5 Use of low power, non-licensed devices.

4.5.1 The use of low power, non licensed devices, including wireless local area networks and wireless microphones, is permitted at LaRC, provided that the devices meet the requirements of Part 15 (47 CFR 15) of the FCC Rules and Regulations and Annex K of the NTIA Manual.

Chapter 6

6.0 RADIO INTERFERENCE

6.1 The probability of harmful RFI increases as more and more demands for frequency assignments are placed in the RF spectrum. In an attempt to meet these demands and to optimize the use of the spectrum, the space between channels is minimized within the limitations imposed by the state-of-the-art development of electronic equipment. The same frequencies are often shared by users separated geographically, or the same frequencies may be assigned to two or more users on a time-share basis. Because of this, some interference can be expected (and even tolerated) since, ordinarily, clear channels are not available within the overcrowded RF spectrum.

Occurrences of interference are to be investigated initially at the lowest possible echelon of NASA spectrum management. Reports of harmful interference or jamming of NASA emitters should be distributed as follows:

a. At the impacted Center:

(1) Office of Safety and Mission Assurance

(2) Occupational Health Office

(3) Local Security Office

b. At NASA Headquarters:

(1) Office of Security Management and Safeguards (Code X)

(2) Office of Inspector General (Code W)

Consideration should also be given to including intentional interference as an information technology security incident, which needs to be reported to the NASA Incident Response Center (NASIRC) and the OIG Computer Crimes unit. Requests for the assignment of replacement frequencies will be made only if the interference is prolonged and disruptive and cannot be cleared through normal procedures.

6.2 RFI Control Procedures

6.2.1 Radio Frequency Users

(1) If interference is so severe that it cannot be tolerated, the radio frequency user will take action as follows:

(a) Promptly document the interference indicating date, time, and location.

(b) Thoroughly check the affected equipment to ensure that the equipment is operating properly according to the manufacturer's specifications and to the specifications
of the Radio Frequency Authorization.

(c) If possible, identify the source of the interference by call sign (or other identification).

(d) Measure the frequency or band of frequencies causing the interference.

(e) Determine the type of emission and the type of traffic being transmitted.

(f) Measure the bandwidth of the interfering signal (highest and lowest frequencies) and note the type of equipment used for measurement.

(g) Measure the interference signal strength with a high quality field strength meter. (Request technical assistance, if necessary.)

(h) Determine the nature or severity of the interference, indicating the impact to operations including data loss or degradation.

(i) Supply any additional information that is necessary or useful in identifying and clearing the RFI (e.g., tape recordings or spectrum photographs).

(j) Immediately report the RFI to the Spectrum Manager's office, providing all information described above where possible.

6.2.2 LaRC Spectrum Manager or Alternate Spectrum Manger

6.2.2.1 The LaRC Spectrum Manager or the Alternate Spectrum Manager will make every effort to clear the interference at the Center before requesting assistance from the National Spectrum Program Manager.

6.2.2.2 Follow the appropriate procedures listed below to clear cases of interference to Agency operations:

Step 1: Check the information supplied by the frequency user to ensure that it is as complete as possible. Request additional information from the user as required for filing the standard RFI report (See Step 6).

Step 2: If the station can be identified, contact the interfering station directly, and attempt to clear the interference through coordination with the station manager. If the

interference originates from a foreign (non-U.S.) source, contact the National Spectrum Program Manager for further assistance (see paragraph 4.2 e (2) and (3)).

Step 3: If direct contact with the interfering station is unsuccessful and the interference appears to be from a non-Government station, request assistance from the nearest FCC monitoring station as required, to coordinate efforts to clear the interference.

Step 4: If the interference is encountered on or from a DOD Test Range, report the RFI to the Area Frequency Coordinator (see Table 3-1) in accordance with appropriate range communications instructions.

Step 5: If all attempts to clear the interference through local coordination fail, report the RFI to the National Spectrum Program Manager in accordance with Steps 6 and 7 below.

Step 6: Forward a message directly to the National Spectrum Program Manager. Use the standard RFI reporting format shown in Figure 4-1 for listing the particulars of the interference.

FIGURE 4-1 STANDARD RFI REPORTING FORMAT

REPORT OF HARMFUL INTERFERENCE

Particulars Concerning the Station Causing the Interference:

A. Name or call sign and category of state.....

B. Frequency measured.....

C. Class of emission.....

D. Bandwidth.....

E. Field strength.....

F. Nature of interference.....

Particulars Concerning the Transmitting Station Interfered with:

G. Name or call sign and category of station.....

H. Frequency assigned.....

I. Frequency measured.....

J. Class of emission.....

K. Bandwidth.....

L. Field strength.....

Particulars Furnished by the Receiving Station Experiencing the Interference:

M. Name of station.....

N. Geographic location of station.....

O. Dates and times of occurrence of harmful interference.....

P. Other particulars.....

Q. Requested action.....

NOTE: For convenience and brevity, prepare reports in the format above, using the letters in the order listed in place of the explanatory titles, and place an "X" after any such letter if no information on that particular item is reported.

Step 7: When practicable, forward a followup letter to the National Spectrum Program Manager. Reference the message by number, date, and time, and include the same information as the message together with a detailed report of local action taken to eliminate the interference.

6.2.2.3 The Center Spectrum Manager should cooperate fully with non-NASA spectrum users in resolving RFI that may be caused by emissions from within the local Center.